

## ABSTRACT

New methods for producing tissue engineered constructs and engineered native tissues are disclosed. The methods include producing a tissue engineered construct by growing cells *in vitro* on a substrate and then decellularizing the construct to produce a decellularized construct consisting largely of extracellular matrix components. The construct can be used immediately or stored until needed. The decellularized construct can be used for further tissue engineering, which may include seeding the construct with cells obtained from the intended recipient of the construct. During any of the growth phases required for production of the construct, the developing construct may be subjected to various tissue engineering steps such as application of mechanical stimuli including pulsatile forces. The methods also include producing an engineered native tissue by harvesting tissue from an animal or human, performing one or more tissue engineering steps on the tissue, and subjecting the tissue to decellularization. The decellularized, engineered native tissue may then be subjected to further tissue engineering steps.

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